Scientific Research Publishing

International Journal of Clinical Medicine, 2018, 9, 841-853
http://www.scirp.org/journal/ijcm
ISSN Online: 2158-2882
ISSN Print: 2158-284X

Pattern of Paediatric Adenoid and Tonsillar Surgery in Ekiti

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How to cite this paper: Adegbiji, W.A., Aremu, S.K., Aluko, A.A.A. and Olubi, O. (2018) Pattern of Paediatric Adenoid and Tonsillar Surgery in Ekiti. *International Journal of Clinical Medicine*, **9**, 841-853.
https://doi.org/10.4236/ijcm.2018.912070

Received: November 24, 2018
Accepted: December 21, 2018
Published: December 24, 2018

Abstract

Background: Surgeries of adenoid, tonsils or both are common pediatric performed by otorhinolaryngologist, head, and neck surgeon worldwide. Clinical pattern and management varied in a different center. This study aimed at determining the rate, socio-demographic features, indications, barriers, types, complications and patients' satisfaction with adenoid and tonsils surgery in low-income countries. **Materials and Methods**: This is a hospital-based retrospective study of pediatric patients who had adenotonsillectomy, adenoidectomy, and tonsillectomy in the study center. This study was carried out over a period of ten years from March 2007 to February 2017. Data for this study was obtained from the medical record department, ENT clinic operation booking register and theatre operation register. All the data obtained were statistically analyzed using SPSS version 16. The data were then expressed by descriptive statistics table, bar charts, and pie charts. Ethical clearance was sought for and obtained from the ethical committee of the institution. **Results**: A total of 463 patients were booked for adenoid and tonsillar surgery out of which 214 patients had surgery done during the study period. This represented 46.2% of the participants that had surgery done. Adenotonsillectomy peaked 38.3% at preschool age group: (1 - 5) years. There were 58.9% males and male to female ratio was 1.5:1. Majority 42.5% of the patients reside in the city while minority 25.7% of the patients were village dwellers. Preschool ages were the majority 40.2% while post-secondary schools ages were the minority 8.4% of the patients. The parents of the majority of the patients were 27.1% health workers and 24.8% business men, while the parent of the minority of the patients was 11.7% farmers and 16.4% industrial workers. Major indications for surgery were 52.3% obstructive sleep apnoea syndrome and 21.5% recurrent tonsillitis. Less common indications for surgery in this study were 1.4% persistent fever and 1.9% cardi-

opulmonary complications. There were 7.0% patients admitted as day cases and 93.0% patients admitted as an in-patient. Postoperatively, 1.4% of the day cases were admitted as inpatients while 1.9% of inpatients were treated as day cases. In this study, the established high risk factors include age less than 1 year 13.6%, Down syndrome 1.4%, craniofacial abnormalities 1.9%, malnutrition 10.7%, serum electrolyte and urea imbalance 10.3%, cardiovascular disease 3.7%, respiratory disease 7.5%, anaemia 8.9%, haemoglobinopathy 3.3% and coagulopathy 1.9%. There were no specific comorbidities that may likely influence the surgical outcome in majority 70.6% of the patients. Adenotonsillectomy was performed on 43.9% patients. Adenoidectomy only was performed on 24.8% patients. The proportion of adenoidectomy alone performed among the age group was 19.2% and 0.5% forages (1 - 5) and (16 - 18) years respectively. **Conclusion**: Adenoid and tonsils surgery are common pediatric otorhinolaryngologist surgical procedures faced with a different form of surgical barriers in low-income countries. These procedures were faced with a various form of risks and the cause of death in this study was cardiopulmonary complications.

Keywords

Adenotonsillectomy, Adenoidectomy, Tonsillectomy, Indication, Techniques, Complications

1. Introduction

Adenotonsillar surgery is surgical removal of adenoid, tonsils or both at same sitting or different sittings [1] [2] [3]. These may be adenoidectomy when only adenoid is removed; tonsillectomy, when only tonsils are removed; adenotonsillectomy, when both adenoid and tonsils are removed. These various forms of adenoid, tonsillar surgery are one of the surgical procedures performed by otorhinolaryngologists, head and neck surgeon all over the world [4] [5]. It is a common otorhinolaryngological surgical procedure in pediatric age group (age younger than 18 years).

The adenoid, tonsil or both are usually surgically removed in patients with the following: obstructive sleep apnoea, nasal obstruction (persistent or recurrent), disruptive snoring, tonsillitis/adenoiditis (recurrent or chronic), unilateral tonsillar enlargement, peritonsillar abscess (quinsy), complications of adenoid and tonsillar disorder such as malnutrition, otitis media, cardiopulmonary disorder, recurrent chest infection, rhinosinusitis, which are resistant to appropriate antibiotic and other medical therapy [6] [7] [8] [9]. Regional indications of adenotonsillectomy may be a component of other procedures such as uvulopalatopharyngoplasty, components in avulsion of symptomatic elongated styloid process [6]. A systemic indication of adenotonsillectomy includes when the tonsils become a focus for distant infection, such as infective endocarditis and glomerulonephritis [6] [10]. The indications for these surgical operations are numerous,

different in the center and often controversial among the otorhinolaryngologist, pediatrician and family physician [11] [12] [13].

There are the various forms of barriers that limit access of the patients to otorhinolaryngological surgery such as adenotonsillectomy in low-income countries. These are further classified into three main types of surgical barriers and they are significantly financial (affordability), cultural (acceptability) and structural (accessibility) surgical barriers [14] [15] [16]. Affordability consists of individuals who had no money for health care, transportation and so on. Accessibility consists of individuals, for whom surgical care was not available to a health facility, personnel or equipment. Acceptability consists of individuals who did not want to undergo surgery due to fear or no trust.

There are different methods of adenoid and tonsillar surgical removal. The traditional, steel blunt dissection technique of tonsillectomy, while the early method of adenoidectomy was by using curette adenoidectomy techniques, is still popular among many otorhinolaryngologists, head and neck surgeons [17] [18] [19] [20]. The other methods are monopolar electrocautery, Electrocauterization, coblation tonsillectomy, Radiofrequency ablation (also called somnoplasty), peak plasma blade, harmonic scalpel tonsillectomy and powered intracapsular tonsillectomy using microdebrider which is some of the most recent techniques of tonsillectomy [17] [18]. Some recent advances in modern techniques of adenoidectomy include microdebridement and functional surgery instruments, electrocautery ablation, coblation, co2 laser adenoidectomy and powered instrumentation [19] [20]. There has been a surgical revolution in modernizing the surgical instruments and techniques of adenotonsillectomy to improve surgical outcome, lower the complications and favorable surgical results. The outcomes of traditional dissection method and curette adenoidectomy techniques are similar to all other forms of adenotonsillectomy surgical techniques [21].

Adenotonsillectomy as the primary treatment adenotonsillar hypertrophy which is the most commonly recognized anatomic risk factor for pediatric obstructive sleep apnoea syndrome is not free of complications. These complications include pain, nausea, vomiting, dehydration, hemorrhage, respiratory decompensation, velopharyngeal incompetence, subglottic stenosis and death [22] [23]. The commonly identified risk factors for postoperative complications in adenotonsillectomy including younger age, obesity, comorbid airway anomalies, Down syndrome and other genetic syndromes, craniofacial abnormalities and neuromuscular disease [24] [25].

There is a paucity of literature on surgical treatment of adenoid and tonsillar disorders in developing countries and Nigeria in particular. This study aimed to determine the rate of adenotonsillectomy, sociodemographic features, indications, barriers to adenotonsillectomy, types of adenotonsillectomy, complications and patients satisfaction post adenotonsillectomy in the developing countries.

2. Materials and Methods

This was a hospital-based retrospective study of pediatric patients who had adenoidectomy, tonsillectomy or adenotonsillectomy. The study was carried out over a period of ten years (from March 2007 to February 2017). This study was carried out in the Ear, Nose, and Throat (ENT) Department of Ekiti State University Teaching Hospital (EKSUTH), Ado Ekiti, Nigeria.

Data for this study was obtained from the medical record department, ENT clinic operation booking register and theatre operation register. The case notes of all the pediatric patients who had adenoid and tonsillar surgery done over the study period were retrieved from the medical record department. Sociodemographic features such as age, gender, parental occupation, parental social habit, domicile and so on were obtained from the patients' case note. Data on patients conditions such as clinical features, diagnosis, indication for surgery, type of adenoid and tonsillar surgery, surgical techniques, complications, and patients satisfaction with the outcome of the surgery were obtained and documented from the case notes.

Those patients that were fit for surgery were properly prepared preoperatively. Those patients that were fit for surgery were then admitted and fasted overnight for at least 6 - 8 the duration of hospital admission were documented. The range of hospitalization varies from 1 - 4 days depending on patients' response to postoperative care. All patients had similar surgical techniques. Adenoid and tonsils did under general anesthesia with orotracheal intubation. The patient was supine positioned and draped. Oral and oropharynx were exposed with the hypopharyngeal pack to protect the lower aerodigestive tract from swallowing and aspiration secretion or blood. Examination under anesthesia was performed pre and postoperatively. Adenoidectomy was performed by curettage of adenoid vegetation. Tonsillectomy was performed by dissection method. Postoperatively feeding on cold diet were encouraged when patients were fully awaked.

Inclusion criteria were all the patients that had adenoid, tonsillar surgery in the department during the study period.

Exclusion criteria were those patients who were not operated. Also patients with incomplete clinical data on this study or those with missing case notes.

Limitation of this study was that instruments for quality of life on adenoid and tonsillar surgery could not be applied. This is a retrospective study.

All the data obtained were collated, documented and statistically analyzed using SPSS version 16. The data were then expressed by descriptive statistics table, bar charts, and pie charts.

Ethical clearance for this study was sought for and obtained from the ethical committee of the institution.

3. Results

A total of 463 patients were booked for adenoid and tonsillar surgery out of which 214 patient had surgery done during the study period. This represented

46.2% of the participants had surgery done.

The age group distribution was shown in Figure 1. The peak was 82 (38.3%) at preschool ages (1 - 5) years while the least age group was 32 (15.0%) at the extreme pediatric ages (16 - 18).

The sociodemographic features of the studied patients were demonstrated in Table 1. There were 126 (58.9%) males and 88 (41.1%) females and the male to

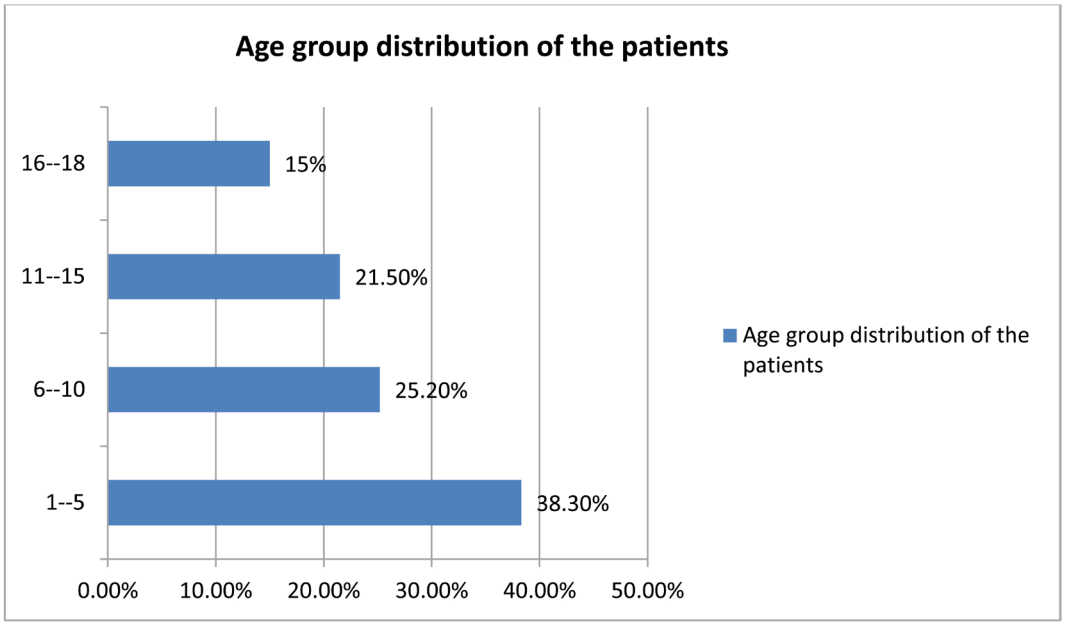

Figure 1. Age group distribution of the patients.

Table 1. Sociodemographic features of the patients.

Sociodemographic features	Number	Percentage (%)
Sex		
Male	126	58.9
Female	88	41.1
Residential		
City	91	42.5
Town	68	31.8
Village	55	25.7
Education level		
Nursery	86	40.2
Primary	53	24.8
Secondary	57	26.6
Post-secondary	18	8.4
Parental occupation		
Healthworker	58	27.1
Business	53	24.8
Teaching	43	20.1
Industrial worker	35	16.4
Farming	25	11.7

female ratio was 1.5:1. Majority 91 (42.5%) of the patients reside in the city while minority 55 (25.7%) of the patients were village dwellers. Nursery or the pre-school ages were the majority 86 (40.2%) of the patients and the minority 18 (8.4%) of the patients were post-secondary schools ages. The parent of the majority of the patients was 58 (27.1%) health workers and 53 (24.8%) businessmen but the parent of the minority of the patients was 25 (11.7%) farmers and 35 (16.4%) industrial workers.

Table 2 illustrated the indications for adenotonsillectomy in the studied patients. Major indications for adenotonsillectomy were 112 (52.3%) obstructive sleep apnoea syndrome secondary to adenotonsillar hypertrophy and 46 (21.5%) recurrent tonsillitis. Less common indications for adenotonsillectomy in this study were 3 (1.4%) persistent fever and 4 (1.9%) cardiopulmonary complications. There were 15 (7.0%) patients admitted as day cases and 199 (93.0%) patients admitted as an inpatient. Postoperatively, 3 (1.4%) of the day cases were admitted as inpatients 4 (1.9%) of inpatients were treated as day cases.

In Figure 2 was an illustration on barriers for adenotonsillectomy. No barriers

Table 2. Indication for adenotonsillectomy.

Indication	Number	Percentage (%)
Obstructive Sleep apnoea	112	52.3
Recurrent tonsillitis	46	21.5
Underweight	16	7.5
Otitis media	14	6.5
Quinsy	13	6.1
Others	6	2.8
Cardiopulmonary complications	4	1.9
Persistent fever	3	1.4

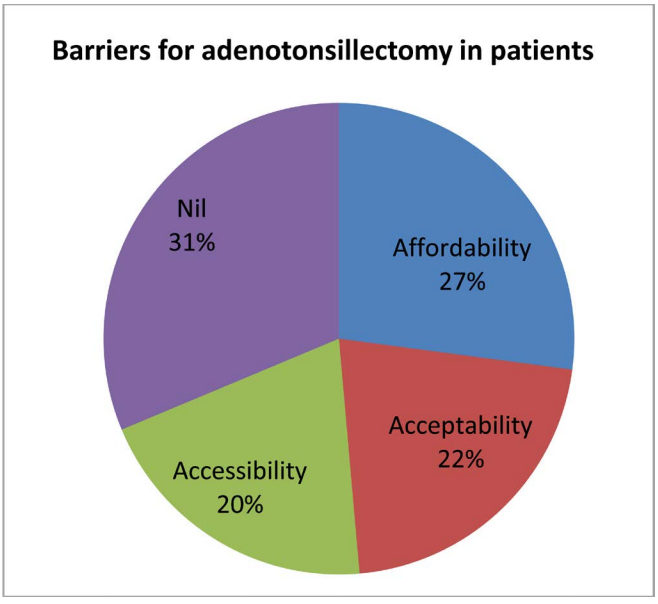

Figure 2. Barriers for adenotonsillectomy in patients.

for adenoid and tonsillar surgery was reported in 67 (31.3%) patients. Barriers such as 58 (27.1%) affordability, 46 (21.5%) acceptability and 43 (20.1%) accessibility were reported by the patients. Affordability in this study includes 24 (11.2%) lack of funds for preoperative investigations and 31 (14.5%) lack of a surgical fee. In acceptability 23 (10.7%) preferred medical treatment to surgery and 21 (9.8%) fear of anesthesia. In this work accessibility was mainly 27 (12.6%) distance patients traveled to the center.

Comorbid illnesses that may affect surgical outcome in patients were illustrated in Table 3. In this study the established high risk factors includes age less than 1 year 29 (13.6%), Down syndrome 3 (1.4%), craniofacial abnormalities 4 (1.9%), malnutrition 23 (10.7%), serum electrolyte and urea imbalance 22 (10.3%), cardiovascular disease 8 (3.7%), respiratory disease 16 (7.5%), anaemia 19 (8.9%), haemoglobinopathy 7 (3.3%) and coagulopathy 4 (1.9%). There were no specific comorbidities that may likely influence the surgical outcome in the majority of 151 (70.6%) of the patients.

Types of adenotonsillectomy among our studied patients were shown in Figure 3.

Table 3. Comorbid illnesses that may affect the surgical outcome in patients.

Comorbid illnesses	Number	Percentage (%)
Ageless than 1 year	29	13.6
Malnutrition	23	10.7
Serumelectrolyteandureaimbalance	22	10.3
Anemia	19	8.9
Respiratory disease	16	7.5
Cardiovascular disease	8	3.7
Haemoglobinopathy	7	3.3
Coagulopathy	4	1.9
Craniofacial abnormalities	4	1.9
Down syndrome	3	1.4

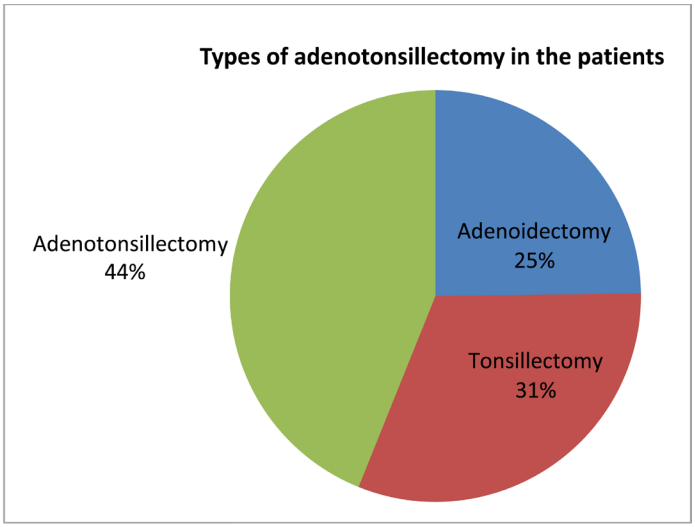

Figure 3. Types of adenotonsillectomy in the patients.

Adenotonsillectomy was performed on 94 (43.9%) patients. Adenoidectomy only was performed on 53 (24.8%) patients. The proportion of adenoidectomy alone among the age group were 41(19.2%), 8(3.7%), 3(1.4%) and 1(0.5%) for ages (1-5), (6-10), (11-15) and (16-18) years respectively. Tonsillectomy only was performed on 67 (31.3%) patients. The proportion of tonsillectomy alone among the age group was nil, 8 (3.7%), 19 (8.9%) and 40 (18.7%) for ages (1 - 5), (6 - 10), (11 - 15) and (16 - 18) years respectively.

Complications associated with adenotonsillectomy among the patients in this study were illustrated in Table 4. No complications were recorded in 12 (5.6%) patients. Most common complications of adenoid and tonsillar surgery in this study were 196 (91.6%) pain at surgical site/odynophagia and 103 (48.1%) vomiting. Less common complications of adenoid and tonsillar surgery in this study were 4 (1.9%) cardiac arrest, 14 (6.5%) otalgia and 18 (8.4%) soft tissue injury. There were 2 (0.9%) death recorded from cardiac arrest {1 (0.5%) preoperative and 1 (0.5%) postoperative}.

Demonstrated in Figure 4 was patients' satisfaction with adenoid and tonsillar

Table 4. Complications associated with adenotonsillectomy in the patients.

Complications	Number	Percentage (%)
Pain surgical site/odynophagia	196	91.6
Vomiting	103	48.1
Nasal regurgitation	23	10.7
Soft tissue injury	18	8.4
Otalgia	14	6.5
Nilcomplication	12	5.6
Cardiac arrest	4	1.9

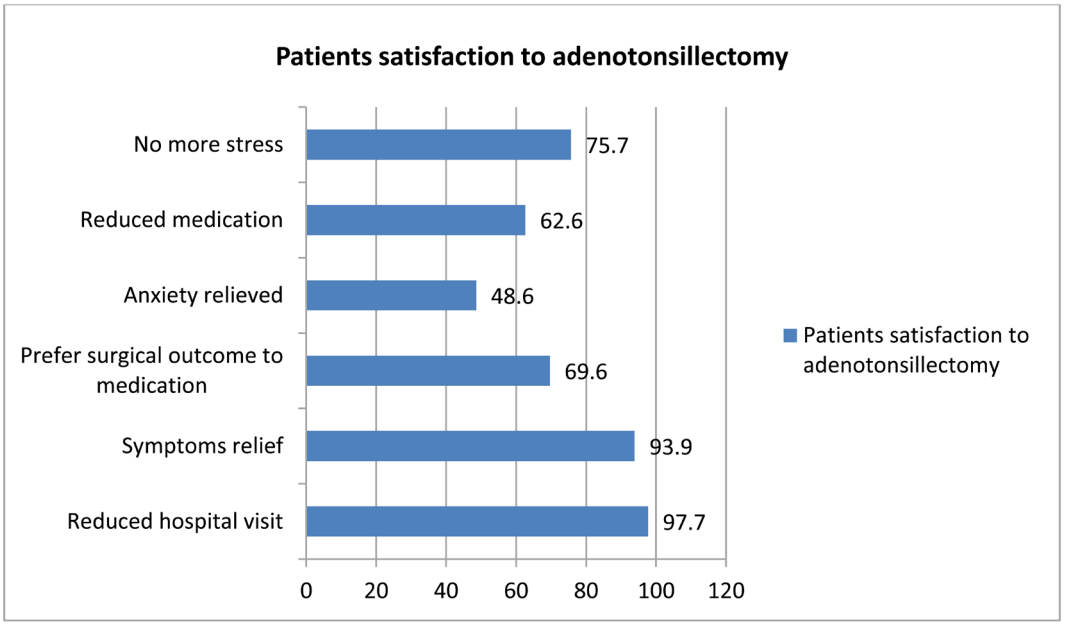

Figure 4. Patients satisfaction to adenotonsillectomy.

surgery postoperatively. Majority of the patients were satisfied with the surgery as 209 (97.7%) reduced hospital visit, 201 (93.9%) symptoms relief and 162 (75.7%) no more stress. The minority of the patients were satisfied with the surgery as 104 (48.6%) anxiety relief and 134 (62.6%) reduced medication.

4. Discussion

Adenoid and tonsillar surgery are common pediatric otorhinolaryngological head and neck surgery worldwide in the ear, nose and throat practice. In this study, the proportion of booked patients for the surgery was about half of the population. These were due to one or more barriers to surgery among the patients. The most significant barriers to adenotonsillectomy surgical uptake by the patients were financial barriers. These include the inability to pay for costs of medication, preoperative investigations, admission fee, surgical fee and so on. Most of these patients are a pediatric age group, dependant and they were sponsored by parents, guardian, relatives, and nonrelative. Accessibility to the center is another major barriers. Majority of the patients resided outside the central location or from neighboring state. Most of the patients preferred alternative treatment to adenotonsillectomy. This is not only because of the surgical fee but patients fear surgery, fear anesthesia, bleeding, pain at the surgical site and so on. All these barriers to surgery and other intervention were documented in previous studies [14] [15] [16] [26].

Preschool age, (1 - 5) years group were predominant in this study more than another age group this may be due to a higher incidence of upper respiratory tract infection and higher activities of lymphoid tissue at the entrance of upper aerodigestive tract. These findings are similar to another study on the pathology of pediatric tonsils [27].

In this study, male patients were commonly scheduled for adenoid and tonsils surgery than the female counterparts. This gender disparity may be as a result of parents in developing and low-income country care more for male children than female children. Male children generally play rough and they are prone to traumatic injury and infection. These findings are similar to report from other study [21].

Adenoid and tonsils surgery in this study were commonly indicated in patients with obstructive adenotonsillar hypertrophy and recurrent tonsillitis. Obstructive adenotonsillar hypertrophy leads to blockage of nasopharyngeal airflow, mouth breathing, snoring and finally obstructive sleep apnoea syndrome. Adenotonsillar hypertrophy may be secondary to allergy or microbes. Mucous discharge stasis from obstructive adenotonsillar hypertrophy is a good culture medium for microbes. Superimposed bacterial infection leads to infection such as recurrent tonsillitis, quinsy, otitis media, and so on. A further effect of adenotonsillar hypertrophy was a loss of olfaction with resultant loss of appetite and malnutrition. These findings were reported in other studies [28] [29].

When adenoid and tonsils surgery was indicated in this study only very few

patients did not experience any form of barriers before the surgery was performed. Majority of the patients experience barriers before the surgery was performed. Commonest barriers were from financing the various aspects of the surgery. This is most likely due to a minority of patients resides in the city, the majority were dependants and the majority of the parents were salary earners (teachers, industrial workers, and health workers). The financial obligations include the cost of laboratory investigations, management, and stabilization for the associated comorbid illnesses in these patients. The main components of the comorbid illnesses include pediatric less than one year, malnutrition, serum electrolyte, and urea imbalance, anemia and cardiopulmonary disorder in the patients.

In this study in the low-income country, tonsillectomy was performed by cold steel dissection method while adenoidectomy was performed by adenoid curette. The commonly performed adenoid and tonsils surgery in this study was adenotonsillectomy while the least surgery was the only adenoidectomy. Adenoidectomy and adenotonsillectomy in this study were mainly secondary to obstructive adenotonsillar hypertrophy with obstructive symptoms such as obstructive sleep apnoea syndrome. This is commoner in much younger paediatric. Similar to this study, adenoidectomy and adenotonsillectomy exclusively indicated in pediatric age group with adenotonsillar hypertrophy in other study [30]. Main indication for tonsillectomy alone in this studied patient was the infection of the lymphoid tissue. The commonly encountered infection in this study was recurrent tonsillitis, peritonsillar abscess (quinsy). These conditions were commoner older pediatric. These findings agree with reports from another study where tonsils infections were the most common indication for tonsillectomy in young adult age group [31].

Common complications encountered in this study of the adenotonsillectomy, adenoidectomy and tonsillectomy were a pain at the surgical site with associated odynophagia. In older pediatric age group there was associated referred otalgia. This is the most common complications among the patients and it is managed immediately postoperatively with intravenous pentazocine and paracetamol. Similarly, drugs were used to manage postoperative pain in adenotonsillar surgery in another study (Strauss, 2012). Maximum pain toleration occurs within 24 hours (first day) post-operative period to the enabled the majority of patients to tolerate cold liquid diet. Ice cream or cold fluid diet was recommended for the patients from when they were fully awake/recover from anesthesia. This practice reduced the proportion of postoperative dehydration among the studied patients. The next most common complication in this study was vomiting. The vomitous in few patients contains alter chocolate brown clotted blood. The vomiting was mainly once. The oropharyngeal examination was done with normal findings. There was no recorded postoperative hemorrhage and surgical infection in all the patients this may be because all the patients were operated by consultant otorhinolaryngologist. The center has not been accredited for residents training. All the patients had prophylaxis antibiotic, intravenous Augmen-

tin (clavunated Amoxicillin). The most deadly complication recorded in this study was perioperative cardiac arrest which is 50% fatal. Two death was recorded out of four patients. One was during induction anesthesia and the second was during extubation of the patients.

About 75% of the patients were fit for discharge on the first day (24 hours) postoperatively. Few (5%) were treated as day cases based on their clinical state and majority had adenoidectomy alone.

The indications for the adenoid and tonsils surgeries were completely resolved in the pediatric in this study. Parents were satisfied with surgery compared to prolonged medical and conservative therapy. Apart from symptoms relief parents also enjoyed reduced hospital visit, reduced medication, and stress with anxiety was no more. These findings are similar to report from other studies[3].

5. Conclusion

Adenoid and tonsils surgery predominant indicated in pediatrics with the adenotonsillar disorder with failed medical and conservative therapy worldwide. Similarly, adenotonsillar surgery was faced with a various form of surgical barriers and risk factors. In a low-income country, the surgical barriers and risk factors must be borne in mind while preparing such patients for surgery to reduce morbidity and mortality.

Limitation of the Study

The limitation of the study is that it is hospital-based and the data can not represent the entire country.

Funding

There was no financial support. It is a self-sponsored research study.

Conflicts of Interest

All the authors declare that there were no competing interests.

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